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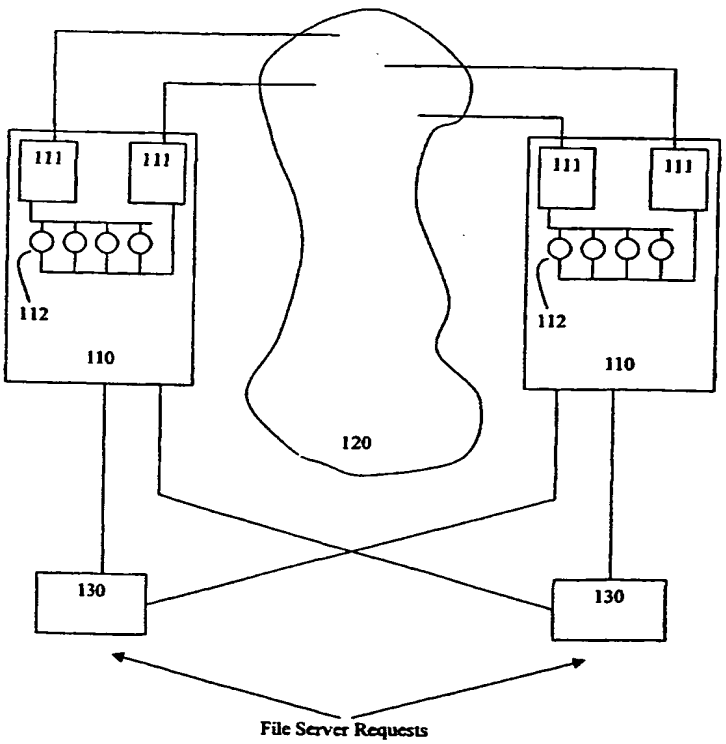
(54) Title: SCALABLE FILE SERVER WITH HIGHLY AVAILABLE PAIRS



(57) Abstract: The invention provides a file server system (100) and a method for operating that system, which is easily scalable in number and type of individual components. A plurality of file servers (110) are coupled using inter-node connectivity, such as an inter-node network, (120) so that any one node (111) can be accessed from any other node (111). Each file server includes a pair of file server nodes (111), each of which has a memory and each of which conducts file server operations by simultaneously writing to its own memory and to that of its twin, the pair being used to simultaneously control a set of storage elements (112) such as disk drives. File server requests directed to particular mass storage elements (112) are routed among file servers (110) using an inter-node switch and processed by the file servers (110) controlling those particular storage elements (112). The mass storage elements (112) are disposed and controlled to form a redundant array, such as a RAID storage system. The inter-node network (120) and inter-node switch are redundant, so that no single point of failure prevents access to an individual storage element. The file servers (110) are disposed and controlled to recognize failure of any single element in the file server system (100) and to provide access to all mass storage elements (112) despite any such failures.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F11/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, INSPEC, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	KLEIMAN S R ET AL: "Using NUMA interconnects for highly available filers" IEEE MICRO, JAN.-FEB. 1999, IEEE, USA, vol. 19, no. 1, pages 42-48, XP002164052 ISSN: 0272-1732	13,14, 16-22
Y	the whole document	1-12,15
Y	US 5 668 943 A (ATTANASIO CLEMENT RICHARD ET AL) 16 September 1997 (1997-09-16) abstract column 3, line 10 -column 4, line 8 figures 1,2	1-12,15

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Leuridan, K

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 862 312 A (TRASATTI PHILIP J ET AL) 19 January 1999 (1999-01-19) abstract column 2, line 15 - line 32 column 2, line 50 - line 67 column 5, line 52 -column 6, line 36 column 13, line 49 -column 14, line 24 figures 1,2,13	1-22
A	BUDDHIKOT M M ET AL: "Design of a large scale multimedia storage server" COMPUTER NETWORKS AND ISDN SYSTEMS,NL,NORTH HOLLAND PUBLISHING. AMSTERDAM, vol. 27, no. 3, 1 December 1994 (1994-12-01), pages 503-517, XP004037983 ISSN: 0169-7552 abstract page 507, left-hand column, line -12 -right-hand column, line 2 page 509, left-hand column, line -6 -page 510, left-hand column, line 8 page 513, left-hand column, line 5 -left-hand column, last line page 514, right-hand column, line 1 -page 515, left-hand column, line -3 figures 1,2,7	1-22

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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